

Response under 37 CFR §1.111
Attorney Docket No.: 042600
Application No.: 10/501,885

REMARKS

Claims 1-6 are pending in the present application.

Claim Rejections - 35 U.S.C. § 103

Claims 1, 2, 4 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kajiwara '972** (US 5,369,972) in view of **Kajiwara '033** (US 5,256,033) as evidenced by **Kajiwara '403** (US 5,318,403); and claims 3 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Kajiwara '972** in view of **Kajiwara '033** as evidenced by **Kajiwara '403**.

Favorable reconsideration is requested.

Applicants respectfully submit that it would not have been obvious to modify Kajiwara '972 based on the teachings of Kajiwara '033 and '403 to include an O-ring in the space formed by the bottom wall 2, guide vane side wall 7 and cylindrical side wall 1 of an adjacent interstage casing.

The Office Action acknowledges that Kajiwara '972 does not disclose an O-ring fitted in a space formed by a relief plate, a stage side portion, a stage flat portion and an inner surface of a cylindrical side portion of an adjacent intermediate casing. (Office Action, page 4.) The Office Action cites Kajiwara '033 and Kajiwara '403 for supporting that this feature would have been obvious.

I. The cited structure of Kajiwara '972 (Fig. 6) is not suitable to be fitted with an O-ring.

Kajiwara '972 discloses that the conventional sheet metal interstage casing (Fig. 6) cited by the Office Action is disadvantageous because "no installation space is available between the interstage casings for O-rings" and that the conventional interstage casing uses liquid gaskets which are not suitable for high pressure applications. (Col. 2, lines 14-22.) Thus, Kajiwara '972 teaches that the cited interstage casing (Fig. 6) is not suitable to be fitted with an O-ring.

The O-ring is not suitable for the structure of Fig. 6 in Kajiwara '972 and the relief plate of the present invention is not taught by Kajiwara '972. In a certain type of multistage pump, several tens of interstage casings are connected to one another sequentially to form a single pump casing. Therefore, the multistage pump requires accurate positioning of interstage casings when assembling them.

In the present invention, the relief plate serves to provide accurate positioning of the intermediate casings by placing the outer circumferential end face of the relief plate in contact with the inner surface of the cylindrical side portion of the adjacent intermediate casing, as recited in claim 1. (See Fig. 2.)

In Kajiwara '972, the guide vane side wall 7 has nothing to do with positioning of the interstage casings. Specifically, positioning of the interstage casings 1 in the axial direction is achieved by the contact between the surface 3a and the surface 4a and positioning of the interstage casings 1 in the radial direction is achieved by the contact between the surface 3b and

the surface 4b. These four surfaces are formed by performing the machining process on the interstage casing 1 (the symbol “ $\Delta\Delta$ ” means the machining process).

While not clearly shown in Fig. 6 of Kajiwara '972, there is a gap between the periphery of the guide vane side wall 7 and the inner surface of the interstage casing 1. This is because the surface 3b and the surface 4b should be kept in contact with each other for positioning of the interstage casings 1 in the radial direction as described above. If the periphery of the guide vane side wall 7 is brought into contact with the inner surface of the interstage casing 1, the surface 3b and the surface 4b are separated from each other, resulting in an inaccurate positioning of the interstage casings 1 in the radial direction.

Since the periphery of the guide vane side wall 7 is located away from the interstage casing 1, the exposed angular edge of the periphery of the guide vane side wall 7 could damage the O-ring. For example, this damage may occur in case of the pumping pressure pressing the O-ring to the guide vane side wall 7. Thus, it is not suitable to install the O-ring in the space formed by the guide vane side wall 7.

In the present invention as recited in the claims, the outer circumferential end face of the relief plate is held in contact with the inner surface of the cylindrical side portion of the adjacent intermediate casing. This configuration can achieve an accurate positioning of the intermediate casings in the radial direction. Moreover, there is no angular portion in the installation space for the O-ring, because no gap is formed in this installation space.

II. The modified structure taught in Kajiwara '972, '033 and '403 does not include a space formed in part by a relief plate.

The Office Action also takes the position that it would have been obvious to modify the structure of the cited conventional interstage casing (Fig. 6) in Kajiwara '972 such that it would be possible to fit an O-ring in a space between the casings. (Office Action, page 4.) Kajiwara '972 itself teaches modifying the structure of the conventional interstage casing to fit an O-ring. (Figs. 1-5.) However, this modified structure taught in Kajiwara does not include a space formed in part by a relief plate, a stage side portion, a stage flat portion and an inner surface of a cylindrical side portion of an adjacent intermediate casing as recited in the present claims. In addition, Kajiwara, '033 and '403 also do not include the space formed as recited in the present claims.

Kajiwara '972, '033 and '403 provide a solution for forming a space in which an O-ring is fitted, but this solution taught in these references does not include a space formed in part by a relief plate. The space for fitting an O-ring in Kajiwara '972, '033 and '403 is formed integrally from the bottom wall, the cylindrical portion and the cylindrical side wall, and by shaping the integral piece such that a space is formed for fitting an O-ring. (Col. 2, line 38 to col. 3, line 7; Figs. 1 and 2.) One of ordinary skill in the art would modify the cited conventional interstage casing of Kajiwara '972 as taught in Kajiwara '972, '033 and '403 in which a space is formed, without a relief plate, for fitting an O-ring. Thus, the present invention as recited in the claims would not have been obvious.

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For at least the foregoing reasons, claims 1-6 are patentable over the cited references. Accordingly, withdrawal of the rejection of claims 1-6 is hereby solicited.

In view of the above remarks, Applicants submit that the claims are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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